



[IWA Publishing Journals](#) | [Subscriptions](#) | [Authors](#) | [Users](#) | [Librarians](#) | [FAQs](#)

Water Science & Technology Vol 47 No 3 pp 117-122 © IWA Publishing 2003

Detection of Naegleria spp. and Naegleria fowleri: a comparison of flagellation tests, ELISA and PCR

J. Behets^{*}, F. Seghi^{**}, P. Declerck^{***}, L. Verelst^{****}, L. Duvivier^{*****}, A. Van Damme^{*****} and F. Ollevier^{*****}

^{*}Laboratory of Aquatic Ecology, Catholic University Leuven, Ch. De Beriostraat 32, B-3000 Leuven, Belgium (E-mail: jonas.behets@bio.kuleuven.ac.be)

^{**}Laboratory of Aquatic Ecology, Catholic University Leuven, Ch. De Beriostraat 32, B-3000 Leuven, Belgium

^{***}Laboratory of Aquatic Ecology, Catholic University Leuven, Ch. De Beriostraat 32, B-3000 Leuven, Belgium

^{****}LABORELEC, Rodestraat 125, 1630 Linkebeek, Belgium

^{*****}LABORELEC, Rodestraat 125, 1630 Linkebeek, Belgium

^{*****}ELECTRABEL, Rodestraat 125, 1630 Linkebeek, Belgium

^{*****}Laboratory of Aquatic Ecology, Catholic University Leuven, Ch. De Beriostraat 32, B-3000 Leuven, Belgium

ABSTRACT

To detect Naegleria spp, in particular Naegleria fowleri, the causative agent of human primary amoebic meningoencephalitis, a flagellation test (FT) is routinely used followed by a specific ELISA. A positive FT indicates the presence of Naegleria spp although some false negatives are likely to occur since parameters for enflagellation vary greatly. As negative FTs are not routinely screened any further for the presence of N. fowleri, this could result in an underestimation of the presence of this pathogen. Therefore, amoebae were further analysed using ELISA and standard PCR not only after a positive but also after a negative FT. In this study 39 cultures containing amoebae were tested with FT, ELISA and the two PCR assays with 11 positive for FT. These were submitted to ELISA and four confirmed as N. fowleri. PCR with the common primer-set on these 11 positive FTs revealed all as Naegleria spp. The specific PCR used on these cultures detected four positive for N. fowleri, corresponding totally with the ELISA results. The 28 negative flagellation tests were also submitted to ELISA and PCR. Of these, 11 were identified as Naegleria spp with common PCR and six as N. fowleri as well as with ELISA and the specific PCR. When the detection of Naegleria spp is based on intermediary processes, such as flagellation tests, false negatives are likely to occur leading to severe underestimations. This study has shown that amoebae taken from negative FTs can be identified as Naegleria spp and N. fowleri when using PCR and ELISA. The application of at least one of the specific N. fowleri tests is recommended for routine screening. The heterogeneous distribution of the false negative results between the different power plants suggested the presence of different genotypes.

[Full article \(PDF Format\)](#)

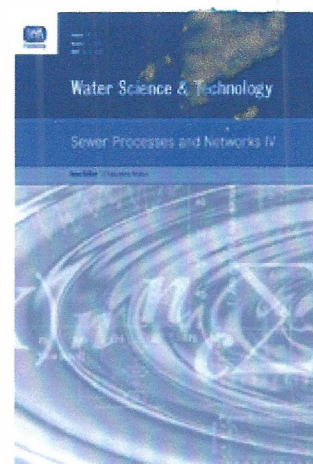
PAY-PER-VIEW: Buy this article for **£20.00** (IWA MEMBER PRICE: **£15.00**)

Add this article to your cart

[Checkout](#)

[> Current Issue](#)
[> Browse Archive](#)
[> Search Archive](#)
[> Sample Issue](#)
[> Subscribe](#)
[> Online Submission](#)
[> ContentsAlert](#)

[> Full Text PDF](#)



ISSN Print: 0273-1223
Published by [IWA Publishing](#)



[IWA Publishing Journals](#) | [Subscriptions](#) | [Authors](#) | [Users](#) | [Librarians](#) | [FAQs](#)

Water Science and Technology Vol 31 No 5-6 pp 119-122 © IWA Publishing 1995

Efficacy of a combined system of copper and silver and free chlorine for inactivation of *Naegleria fowleri* amoebas in water

J. M. Cassells*, M. T. Yahya**, C. P. Gerba* and J. B. Rose***

*Department of Soil and Water Science, and Department of Microbiology and Immunology, University of Arizona Tucson, AZ 85721 USA

**County Sanitation Districts of Orange County Fountain Valley, CA 92679 USA

***Department of Environmental and Occupational Health, University of South Florida Tampa, FL 33612 USA

ABSTRACT

Electrolytically generated copper and silver ions (400:40 and 800:80 μ g/l) were evaluated, separately and combined with 1.0 mg/l free chlorine, for their efficacy in reducing the viable numbers of *Naegleria fowleri* amoebas in water (pH 7.3 and 23-25°C). Inactivation rates ($k = \log_{10}$ reduction/min) and T_{99} values (exposure time required to achieve a 99% or a 2 $\log_{10}$ reduction) of the disinfectants were determined. Copper and silver alone, at ratio of 400:40 to 800:80 μ g/l caused no significant inactivation of *N. fowleri* even after 72 hours of exposure ($k = 0.00017$ and 0.00013 , respectively). Addition of 1.0 mg/l free chlorine to water which contained 400:40 or 800:80 μ g/l copper and silver resulted in enhanced inactivation rates ($k = 0.458$ and 0.515 , respectively) compared to either chlorine alone ($k = 0.33$) or the metals alone. Water containing 800:80 μ g/l copper and silver with 1.0 mg/l chlorine showed a T_{99} value of 3.9 minutes, while chlorine alone showed a T_{99} of 6.1 minutes. Enhanced inactivation of *N. fowleri* by a combined system of free chlorine and copper and silver may be attributed to the different mechanism that each disinfectant utilizes in inactivating the amoebas, and may suggest a synergistic effect.

[Full article \(PDF Format\)](#)

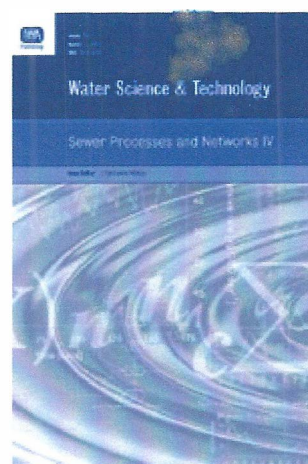
PAY-PER-VIEW: Buy this article for **£20.00** (IWA MEMBER PRICE: **£15.00**)

Add this article to your cart

[Checkout](#)

> [Current Issue](#)
> [Browse Archive](#)
> [Search Archive](#)
> [Sample Issue](#)
> [Subscribe](#)
> [Online Submission](#)
> [ContentsAlert](#)

> [Full Text PDF](#)



ISSN Print: 0273-1223
Published by [IWA Publishing](#)



Online

[IWA Publishing Journals](#) | [Subscriptions](#) | [Authors](#) | [Users](#) | [Librarians](#) | [FAQs](#)

J Water Health **04** (2006) 395-404

Effect of soil depth and texture on fecal bacteria removal from septic effluents

A. D. Karathanasis, T. G. Mueller, B. Boone and Y. L. Thompson

Department of Plant & Soil Sciences, University of Kentucky, N-122K Ag. Science North, Lexington, Ky 40546, USA, Tel.: 859-257-5925, Fax: 859-257-3655, akaratha@uky.edu

Department of Plant & Soil Sciences, University of Kentucky, Lexington, KY, USA

Department of Plant & Soil Sciences, University of Kentucky, Lexington, KY, USA

Department of Plant & Soil Sciences, University of Kentucky, Lexington, KY, USA

ABSTRACT

This study evaluated the effectiveness of soils with different texture and depth to treat fecal bacteria eluted from a house-hold septic effluent. The assessments were accomplished by leaching undisturbed soil monoliths of 30, 45, and 60 cm thickness and 25 cm in diameter, representing the four different textural groups and hydraulic loadings recommended by the Kentucky Health Department, with domestic wastewater effluent collected regularly from a house-hold septic system. Eluent concentrations were monitored daily over a 15 day period for fecal coliform and fecal streptococci concentrations. The results of the study indicate an alarming frequency of failure to comply with United States Environmental Protection Agency (USEPA) criteria for depth to groundwater, when using a 30 cm vertical separation distance between the bottom of the drain-field and a limiting soil interface. The treatment performance was especially poor in coarse-textured soils. Although biomat development over time is expected to improve treatment, the high influent levels of fecal bacteria pose great concerns for surface and groundwater contamination. Fine-textured soils generally provided better treatment efficiency and more consistent compliance with EPA standards. Treatment efficiency and compliance usually improved with increasing soil depth, with the 60 cm thickness providing the most consistent performance and compliance with maximum discharge limit (MDL) requirements. The findings of this study document a general inadequacy of the 30 cm vertical separation distance to provide effective treatment of septic effluents in Kentucky soils, particularly in coarse-textured soils. Considering that increasing the soil depth thickness may be impractical in many marginal soils, complementary or alternative treatment technologies should be adopted to improve treatment efficiency and prevent further deterioration of the quality of water resources.

[Full article \(PDF Format\)](#)

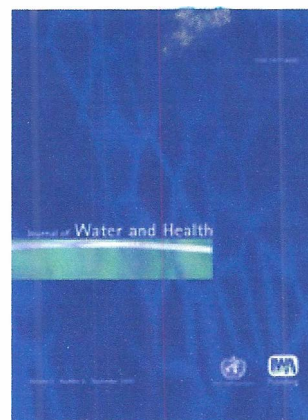
PAY-PER-VIEW: Buy this article for **£20.00** (IWA MEMBER PRICE: **£15.00**)

Add this article to your cart

[Checkout](#)

[> Online Preview](#)
[> Current Issue](#)
[> Browse Archive](#)
[> Search Archive](#)
[> Sample Issue](#)
[> Subscribe](#)
[> Online Submission](#)
[> ContentsAlert](#)

[> Full Text PDF](#)



World Health Organization

ISSN Print: 1477-8920
Published by [IWA Publishing](#)



[IWA Publishing Journals](#) | [Subscriptions](#) | [Authors](#) | [Users](#) | [Librarians](#) | [FAQs](#)

J Water Health (2006) 177-195

Nutrient removal from septic effluents as affected by soil thickness and texture

A. D. Karathanasis, T. G. Mueller, B. Boone and Y. L. Thompson

Department of Plant and Soil Sciences, University of Kentucky, N-122K Ag. Science-North, Lexington, KY, USA, akaratha@uky.edu

Department of Plant and Soil Sciences, University of Kentucky, N-122K Ag. Science-North, Lexington, KY, USA, akaratha@uky.edu

Department of Plant and Soil Sciences, University of Kentucky, N-122K Ag. Science-North, Lexington, KY, USA, akaratha@uky.edu

Department of Plant and Soil Sciences, University of Kentucky, N-122K Ag. Science-North, Lexington, KY, USA, akaratha@uky.edu

ABSTRACT

This study evaluated the effectiveness of soils with different textures and thickness to treat BOD, N and P eluted from household septic effluent. The assessments were accomplished by leaching undisturbed soil monoliths of 30, 45 and 60 cm thickness and 25 cm in diameter, representing the four different textural groups and hydraulic loadings recommended by the Kentucky Health Department, with domestic wastewater effluent collected regularly from a household septic system. Effluent concentrations were monitored daily over a 15 d period for biochemical oxygen demand (BOD), total-N, $\text{NH}_4\text{-N}$, $\text{NO}_3\text{-N}$ and total-P concentrations. The results of the study indicate an alarming frequency of failure to comply with EPA criteria for BOD, total-N and $\text{NH}_4\text{-N}$ concentrations when using a 30 cm vertical separation distance between the bottom of the drain field and a limiting soil interface. The treatment performance was particularly poor in coarse-textured soils, apparently due to insufficient reactive surface area. Although biomat development over time is expected to improve the treatment for some of these parameters, the high influent levels of BOD pose great concerns for surface and groundwater contamination during the early stages of operation. Fine-textured soils generally provided better treatment efficiency and more consistent compliance with EPA standards for BOD, total-N, $\text{NH}_4\text{-N}$ and total-P, as well as greater nitrification/denitrification potential. Treatment efficiency and compliance usually improved with increasing soil depth, with the 60 cm thickness providing the most consistent performance and compliance with MDL requirements. Considering that increasing soil thickness requirements may be impractical in many marginal soils, complementary or alternative treatment technologies should be adopted to improve treatment efficiency and prevent further deterioration of the quality of water resources.

[Full article \(PDF Format\)](#)

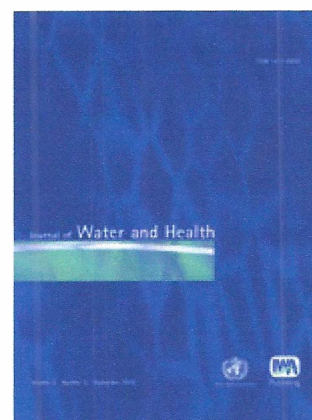
PAY-PER-VIEW: Buy this article for **£20.00** (IWA MEMBER PRICE: **£15.00**)

Add this article to your cart

[Checkout](#)

- > [Online Preview](#)
- > [Current Issue](#)
- > [Browse Archive](#)
- > [Search Archive](#)
- > [Sample Issue](#)
- > [Subscribe](#)
- > [Online Submission](#)
- > [ContentsAlert](#)

> [Full Text PDF](#)



World Health Organization

ISSN Print: 1477-8920
Published by [IWA Publishing](#)